

DRAWINGS ATTACHED.

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COMPLETE SPECIFICATION.

Improvements in or relating to a Separable Element Connecting Device.

We, TARWIL-ROSOFFLEX, a French joint stock Company, of 123, rue La Fayette, Paris 10ème, France, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to a new separable element connecting device of simple but strong design, able to be used for connecting, joining, holding and assembling two parts to be united, such as flexible or rigid bonds, elements of circuits for conducting heat or electricity, strips of material, necklaces, bracelets, belts, underclothings, wires, cords and cables of all kinds.

According to the present invention there is provided a connecting device comprising a female element having an elongated body with a hollow space therein which is closed at one end of the body, a pair of slots extending longitudinally of the body and each communicating with the hollow space, a pair of flexible arms extending longitudinally of the body and each connected to the body adjacent the closed end thereof and a retaining shoulder at the end of each slot remote from the closed end of the body, the device also comprising a male element having an elongated body portion and a pair of flexible tongues extending away from and longitudinally of the body portion of the male element and connected to said body portion at one end thereof, whereby as said one end is inserted into the body of the female element the tongues are urged towards said body portion so that they can pass through the open end of the body until the tongues expand into said slots whereupon retraction of the male member is prevented by the retaining shoulders until the flexible arms are pushed to urge the tongues towards said body portion

until the tongues can pass between said shoulders.

Constructional embodiments of the present invention will now be described, by way of example, with reference to the accompanying drawing, wherein:

Fig. 1 is an elevation of a connecting device according to the invention;

Figs. 2 and 3 are cross-sections respectively taken along the lines II—II and III—III of Fig. 1;

Fig. 2a is a cross-section similar to Fig. 2 showing an alternative embodiment;

Fig. 4 is an elevation showing one of the assembling stages of elements forming the device;

Fig. 5 is an elevation, partly in section, showing the device in the connecting position;

Fig. 6 is a partial section showing on a larger scale, a characteristic detail of the device placed in the position according to Fig. 5;

Fig. 7 is an elevation showing, on a smaller scale, a second form of embodiment of the device; and

Fig. 8 is a partial elevation showing an alternative execution of the device according to Fig. 7.

According to the first form of embodiment shown in Figs. 1 to 6, the connecting device according to the invention comprises a female element 1 and a male element 2 fitting into the element 1, the elements being made of any suitable material chosen in relation to the particular application for which the device is provided.

The female element 1 comprises a hollow body or elongated tubular element 3, preferably having a length and width several times greater than its thickness, delimiting an internal space 4 of rectangular cross-

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section. This space 4 is closed, at one of the ends of the body 3, by an end 5 which is connected to a fixing member 6. In the embodiment shown, the member 6 is shaped in the form of a loop or eyelet. The member 6 may, however, consist of a clip, hook or a perforated, pierced or splayed strap.

Replacing or in combination with the member 6, the body 3 can also have, in one of the side walls of the body, two transverse rectangular apertures 7. These apertures are made in line with two rows of holes 8 drilled in the opposite side wall of the tubular element. This is more particularly provided for ensuring the fixing of the female element 1 on any kind of support, similar to a button sewn on by machine. Actually, the needle of the latter can be made alternately to pass through the holes 8 of each row for ensuring the connection with the spool thread. The transverse extent, as well as width of the apertures 7 is sufficient for the passage of most known sewing machine needles. To avoid the thickness of the thread connecting the holes 8 projecting inside the space 4, the inner face of the corresponding side wall advantageously comprises a groove 9 between these holes. For the same purpose, Fig. 2a shows an alternative embodiment, according to which the inner face of the side wall has holes 8 delimiting a clearance 10 extending substantially along the entire length of said wall.

The tubular hollow body 3 has, in substantially the middle of the longitudinal sides, relative to the width and thickness of said sides, i.e. mid-way between the ends and mid-way between the faces, two slots 11 communicating through apertures 12 with the space 4. These slots 11 are provided over length greater than two arms 13 formed from the longitudinal edges of the body 3. A transverse cut 14 is made in each arm 13, as far as the slot 11, so that the corresponding arm 13 is solely connected to the body 3 by a base 15 situated at the end of the arm adjacent the member 6. The thickness of each base 15 is determined in relation to the material of which the female element 1 is made for imparting to the arm 13 a certain flexibility, especially under a stress directed in the direction of the arrow f_1 . The cut 14 is, moreover, spaced from the end of the slot 11, so as to provide in the longitudinal edge, a rigid nose or shoulder 16 extending partly above the slot 11.

The male element comprises a flat body 17 whose length and maximum thickness exactly correspond to the dimensions of the space 4. In a similar manner to the female element 1, the body 17 is provided at one of its ends, with an attaching member 18, e.g. a transverse eyelet. Although not shown, the member 18 can be replaced by a perforated, pierced or splayed strap, or even by a hook

or clip. The body 17, of harpoon or arrow shape, comprises two small elastic side tongues 19 isolated from the longitudinal edges by two slits 20. The small tongues 19 are made so that when not stressed they diverge towards the attaching member 18, to an extent that the end faces of their angular parts 21, lie in a plane substantially perpendicular to the longitudinal sides of the body 17. The length l of these small tongues 19, comprised between the noses 21 and the engaging end of the body 17 is chosen to be slightly less than the length "L" comprised in the female element 1 between the end 5 and the end of the slots 11 extending under the shoulders 16.

As can be seen in Fig. 3, the two side faces of the body 17 can have two recesses 22 corresponding to the thickness of the thread connecting the holes 8 of the female element 1 when the inner face of the side wall with said holes does not delimit either grooves 9 or clearances 10.

As can be seen from Fig. 1, the assembling of the separable elements 1 and 2, is done by introducing the body 17 of the male element 2 into the space 4 of the female element 1. During this introduction, shown in Fig. 4, the small tongues 19 are elastically deformed to close the slits 20. The introducing of the body 17, started as described above, is continued until complete engagement when the leading end is brought into abutment against the end 5 of the tubular element 3. In this position, shown in Fig. 5, the small tongues 19 are in exact coincidence with the apertures 12, so that by reaction to the elastic deformation, they enter into the slots 11 at least by their terminal parts forming noses 21. As can be more clearly seen in Fig. 6, the noses 21 lie totally in the slots 11 and are held under a relatively slight tension by the shoulders 16, without surface contact with the arms 13. This particular characteristic is provided to avoid subjecting the bases 15 to bending stresses likely to accelerate deterioration.

After totally engaging the body 17 within the female element 1, the noses 21 of the small tongues 19 face the ends of the slots 11 which prevents any possibility of disengaging under a traction stress relatively exerted between the elements 1 and 2.

For separating the male and female elements, it is necessary to depress both arms 13 in the direction of the arrows f_1 , so as to cause their partial entry into the slots 11. During this entry, the parts of the arms 13 adjacent the cuts 14 thrust the small tongues 19 to close the slots 20 and to retract the noses 21 from the shoulders 16. It is then possible by a relative pull to release the body 17 from the tubular element 3.

Another form of embodiment of the device is shown by Fig. 7, according to which

the female element 1 comprises a longer body 3 which has two pairs of arms 13 and 13a which are in series and made exactly as described above. The male element 2 forms a flat body 22 of equal length to that of the body 3 and which delimits at its front end, two small tongues 19, identical to those of the body 17.

When assembling the male and female elements described above, the small tongues 19 of the body 22 are made to engage first in the apertures 12a corresponding to the first pair of arms 13a level with which they make a first engagement which can be called "safety" or "regulating", according to the application sought. Final engagement is obtained by continuing the engaging of the body 22 so that the small tongues 19 engage in the apertures 12 of the second pair of arms 13.

This form of embodiment has an important advantage with regard to the risks of unintentionally separating the female and male elements 1 and 2. Actually, if for any reason the arms 13 are simultaneously thrust in the direction of the arrows f_1 , the body 22 of the male element 2 can be made to partially disengage itself from the tubular body 3, until the small tongues 19 come opposite to the apertures 12a of the arms 13a. The automatic engaging of the small tongues 19 in these apertures then sets up an automatic safety engagement which prevents any accident whereby the fastening comes undone.

Fig. 8 shows that the body 22 can comprise two small tongue assemblies 19 and 19a made for simultaneous engaging in the apertures 12 and 12a of the pairs of arms 13 and 13a. In such case, the disengaging of the body 22 is obtained by simultaneously causing the pairs of arms 13 and 13a to be pushed in.

WHAT WE CLAIM IS:—

1. A connecting device comprising a female element having an elongated body with a hollow space therein which is closed at one end of the body, a pair of slots extending longitudinally of the body and each communicating with the hollow space, a pair of flexible arms extending longitudinally of the body and each connected to the body adjacent the closed end thereof and a retaining shoulder at the end of each slot remote from the closed end of the body, the device also comprising a male element having an elongated body portion and a pair of flexible tongues extending away from and longitudinally of the body portion of the male element

and connected to said body portion at one end thereof, whereby as said one end is inserted into the body of the female element the tongues are urged towards said body portion so that they can pass through the open end of the body until the tongues expand into said slots whereupon retraction of the male member is prevented by the retaining shoulders until the flexible arms are pushed to urge the tongues towards said body portion until the tongues can pass between said shoulders.

2. A connecting device as claimed in Claim 1, wherein the female member has two pairs of slots, arms and shoulders arranged in series and the male member has a single pair of tongues.

3. A connecting device as claimed in Claim 1, wherein the female element has two pairs of slots, arms and shoulders arranged in series and the male member has two pairs of tongues arranged in series and spaced apart by the same amount as the pairs of slots, arms and shoulders.

4. A connecting device as claimed in Claim 1, 2 or 3, wherein the body of the female element has a length and width several times greater than its thickness.

5. A connecting device as claimed in Claim 4, wherein the hollow space is rectangular in cross-section.

6. A connecting device as claimed in Claim 5, wherein the length and maximum thickness of the body portion of the male member correspond to the dimensions of said hollow space.

7. A connecting device as claimed in any one of Claims 1 to 6, wherein attaching members are connected to the closed end of the body and the end of the body portion remote from said one end thereof, respectively.

8. A connecting device as claimed in any one of Claims 1 to 7, wherein the body has two rows of holes in one of its side walls and two rectangular slots in its other side wall.

9. A connecting device as claimed in Claim 8, wherein said one side wall has recesses so that thread passing through said holes to sew the female member to material does not protrude into the hollow space.

10. A connecting device substantially as described with reference to any one of the embodiments shown in the accompanying drawing.

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